

**AGFA**  
**FORMULAS**  
**FOR**  
**PHOTOGRAPHIC USE**



**AGFA ANSCO CORPORATION**  
**BINGHAMTON, N. Y.**

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## CHEMISTRY FOR THE PHOTOGRAPHER

**P**HOTOGRAPHERS everywhere realize the importance which chemistry holds in photographic work, but often consider the subject too formidable and involved for application to their own work. This discussion has been prepared to help dispel that fear, and to show that theoretical knowledge is unimportant if the photographer knows in a practical way, what is in a developing or fixing solution, why it is there and how it accomplishes its own particular job.

The general structure of photographic film, its components of nitro cellulose (or acetyl cellulose) base, emulsion coating of gelatine which contains suspended particles of light-sensitive silver salt, and auxiliary layers for such purposes as prevention of halation, are common knowledge among photographers. The chemistry involved in this branch of the science is held under precise control by the manufacturer and causes the photographer little concern. Photographic chemistry begins to affect the photographer more directly in the developing and fixing operations carried out with film and paper. It is therefore well

worth while to consider first the composition and function of the developing solution to see what it contains and what it does to effect development.

When a photographic emulsion is exposed to light, the silver salt (silver bromide, chloride or iodide) which the light reaches, undergoes a definite though invisible change to form what is known as the latent image. It is not yet definitely known just how this change takes place, but it is believed that the exposed parts of the emulsion gain a certain "activation" that makes them susceptible to the reducing action of a developer. When placed in a developing solution the exposed, "activated" particles of silver salt are reduced chemically to black metallic silver, leaving the unexposed particles of silver salt unchanged. Reduction in this sense does not have the meaning commonly thought of in the photographic field, namely, the lessening of density in a film negative. This *chemical* reduction is a conversion of the silver salt to free silver and for the reaction one or more *reducing agents* — which photographers call "developers," are necessary.

#### THE DEVELOPER'S BASIC COMPONENT

There are many chemicals which are reducing agents, but most of them are too powerful to be used for developing because they reduce all the silver salt in the emulsion without regard to the latent image which exposure in the camera has produced. Therefore a reducing agent must be selected which is satisfactory as a developer and which confines its action to the exposed particles of silver salt, leaving the remainder unaffected. Of the reducing agents that are satisfactory for photographic use, metol, hydroquinone and pyro are most commonly used, and there are in addition other developing agents such as glycin, amidol and rodinal frequently employed. There are also several developing agents on the market under different names than metol, but which are basically the same chemical — monomethyl-para-amino-phenol-sulphate.

As has been indicated, the chemical action of these developing agents is fundamentally the same. The photographic effect, however, depends to a large extent on the particular developing agent and the way in which it is used. Thus many developers contain a combination of developing agents, and one formula may have, for example, a high percentage of hydroquinone to produce brilliant photographic images while another formula

may use a larger ratio of metol to produce softer results.

It is obvious therefore, that great care should be taken in the preparation of developing solutions, for a slight error in the type or amount of the developing agents (or the other constituents too, for that matter) may have a serious effect on the behavior of the developer. Most successful photographers have found that it is far wiser to use the formulas recommended by the manufacturer and to make sure solutions are carefully and accurately mixed, than to spend time on individual experimenting or research. The use of recommended formulas is undoubtedly one of the most important helps to getting good results in film development.

#### OTHER INGREDIENTS OF THE DEVELOPING SOLUTION

The function and importance of the developing agent in the developer have both been mentioned—but there are three other components which also play an important role in any developing solution. The first of these is the alkali—which is ordinarily essential for development. Most of the developing agents in use today are neutral or slightly acid in their normal state, and in this condition give little or no developing action. However, when an alkaline salt like sodium carbonate is introduced into the solution

containing the developing agent, a very interesting change takes place. The developing agent forms what is called an alkaline salt which in a photographic sense is a more active material, and it is this alkaline salt of the developing agent that actually reduces the exposed grains of silver salt to metallic silver. The alkali has a secondary effect in the developing solution which is also important. It helps the gelatine emulsion to swell and thus facilitates the penetration of the developing solution throughout the network layer of the emulsion.

It is obvious that the alkali is a really important component of the developing solution and it is likewise evident that care must be exercised in using the right kind and correct amount of alkali. Sodium carbonate is normally recommended though potassium carbonate is sometimes used in its place. The caustic alkalis, sodium hydroxide and potassium hydroxide, should not be substituted unless definitely specified as they are much stronger and can easily cause fog. Normally they are used only in special-purpose developers giving high contrast. Borax and similar alkalis which are less energetic are often specified for fine-grain development in which grain size must be controlled by softer development.

The amount of alkali should of course be weighed accurately to the amount

specified, as too much may cause fog in developed negatives; too little may result in slow, soft development. It is important to remember when using carbonate, that the potassium salt is generally available only in the anhydrous form, while the more generally used sodium salt can be obtained as (1) the anhydrous salt containing about 2% water, (2) the monohydrated salt containing about 15% water, or (3) in crystal form containing about 63% water. The anhydrous and crystalline forms are both unstable at ordinary conditions of temperature and humidity, and must be kept in tightly sealed containers and used with great care to prevent considerable absorption of water from the atmosphere by the anhydrous salt, or loss of water by the crystalline form. The monohydrated form of sodium carbonate is stable and therefore preferred by most photographers for accurate preparation of developing solutions.

#### THE IMPORTANCE OF A PRESERVATIVE

It is a characteristic of many photographic reducing agents in alkaline solutions to combine freely and easily with oxygen. Because of this "hunger" for oxygen, alkaline solutions of the developing agents spoil very quickly when exposed to air. To increase their useful life, to allow the developing agent to do its work on the exposed silver halide as

desired, and to prevent the occurrence of stains, a preservative must be added to the developing solution.

Sodium sulphite is ordinarily used as the preservative, though in developers prepared for stock in two solutions, preservatives which are slightly acid in solution such as sodium bisulphite and potassium metabisulphite are preferred. Because developing agents keep better in acid solution than in one which is alkaline, it is common practice to use one of these acid sulphites as the preservative in the developer part of the stock solution. In single-solution developers, sodium bisulphite is never used alone as a preservative since it neutralizes some of the alkali in the solution and would result in softer development. One other interesting point about preservatives is that in some cases the preservative performs a secondary function in the developer. In some fine-grain developers, for instance, a large amount of sodium sulphite is used to aid in keeping grain size at a minimum.

The fourth and final important component of the typical developing solution is the restrainer, potassium bromide. This necessary constituent of the developing solution acts as a "brake" on the chemical reaction of development and keeps the operation under control. The

action of the restrainer is such that an increase in the concentration of potassium bromide in the developer tends to slow down or "restrain" the development of the photographic image. The concentration of potassium bromide in the solution is obviously important, for too much may retard development excessively and indicate an apparent loss of speed while too little may permit development of fog.

#### THE IMPORTANCE OF A SHORT STOP

As negatives or prints are removed from the developing solution they carry with them considerable amounts of alkali and other chemicals which can contaminate the fixing bath and interfere with its action. Used-up developer carried along with negatives and prints can also cause troublesome stains if some method is not used to stop development instantly and completely. The best and most reliable way of doing this is the well-known short-stop bath of dilute acetic acid which neutralizes any alkali remaining on negatives or prints and prevents contamination of the fixing solution. Yet it is surprising how many photographers still try to get along without this intermediate bath between development and fixation. It is true that an acid fixing bath will give satisfactory results without the use of a preliminary short-stop bath, but its useful life is se-

verely limited when a short-stop is not used.

Photographers frequently ask why acetic acid is used for the short-stop bath and fixing bath instead of other common acids like hydrochloric or sulphuric. The answer lies in the fact that a relatively large amount of acid must be available but the solution must not be too strongly acid. Consequently a compound is used which is weak in acidity but which has available a high reserve of acid to neutralize alkali. A correspondingly larger amount of the weak acetic acid may therefore be used than could be used of a strong acid.

#### COMPOSITION AND FUNCTION OF THE FIXING BATH

The procedure of fixation is relatively simple but it should be carried out with considerable care as it can be the source of much trouble when improperly handled. The photographic film negative upon removal from the developing solution is still sensitive to light, as it contains undeveloped silver salt in the shadow portions of the image. To make the negative image permanent by removing this undeveloped silver salt, as well as to make it clear and transparent for printing, the action of the familiar fixing bath must be employed. The principle constituent of the fixing solution is sodium thiosulphate, more com-

monly known as "hypo" (from its older name of sodium hyposulphite), for in solution this useful chemical has the property of dissolving light-sensitive silver salts. The method by which the silver salt is removed is generally considered as, first, a conversion to a soluble double salt by the hypo, and second, the washing out of this soluble salt with water.

The conventional fixing solution generally contains other chemicals in addition to the hypo. Acetic acid is often included to aid in regulating the acidity of the fixing solution and to prevent stains. However, a hypo solution containing much acid is apt to precipitate sulphur, so another chemical, sodium sulphite, is added to prevent this unwanted reaction.

An additional component of the usual fixing bath is the hardening agent which prevents frilling and softening of the gelatine emulsion. White potassium alum (potassium aluminum sulphate) is usually employed for this purpose though some photographers prefer potassium chrome alum used with a small amount of sulphuric acid. Care must be used with chrome alum as the hardener, however, as it rapidly loses its strength and is only truly effective when a fresh solution is used.

Fixing baths will seldom if ever give

trouble when properly prepared from pure chemicals. If a bath turns milky after preparation it indicates that sulphur is precipitating because of too much or too strong an acid, too little sulphite, too high a temperature of the solution, or improper mixing. A milky appearance of the bath during use is due to the presence of excess alkali and indicates that the bath should be replaced. It is important not to overwork the fixing bath, because a nearly exhausted fixing solution will not completely remove the silver salts, and prints or negatives may turn yellow or stain on aging. A gallon of standard strength fixing bath should fix 100 8 x 10" double-weight prints or their equivalent. When the bath froths or foams it should be replaced. Many photographers have found a convenient, certain and economical method of insuring complete fixation lies in the use of two fixing solutions. Fixing is carried out first in the more used of the two baths and finally in the fresher solution. When the older bath becomes exhausted, the partly used solution takes its place and a fresh fixing bath is prepared for the second solution.

#### **SUGGESTIONS FOR TROUBLE-FREE MIXING**

The first and perhaps most important point to follow in the preparation of solutions is that of using chemicals which are "photographically pure." Cheap

commercial grades of every chemical used in photographic processes can be obtained, but many of them contain impurities which are detrimental to perfect results. Chemicals which are marked "C.P." (Chemically Pure) and those which are marketed for photographic purposes by reliable manufacturers are always safe to use, and can be depended upon. Chemicals marked U.S.P. may be suitable if the amount of impurity present is known to be insignificant. This can be determined by looking up the U.S.P. standards for the chemical in question by consulting the edition of the United States Pharmacopia, tenth edition (1925) or eleventh edition (1935) as indicated by the number X or XI which follows the U.S.P. on the chemical container label.

The second most important rule for trouble-free solutions is perhaps that of mixing all components of a solution in the order listed in the formula. This is extremely important and lack of attention to this point can easily result in the formation of precipitates which will not dissolve in the solution. A worth-while corollary to this rule is to wait until each chemical is thoroughly dissolved before adding the next component of the solution. In most single-solution developers the preservative sodium sulphite is usually added immediately after the devel-



oping agent but before the hydroquinone if this chemical is used. When two developing agents such as metol and hydroquinone are used, the addition is generally made in the order metol, sulphite, hydroquinone. However, with developing agents like glycine, the sulphite and carbonate are dissolved first, as the glycine dissolves with great difficulty otherwise.

A third important rule for any photographer is to use the purest water obtainable. Innumerable troubles in developing and fixing have been traced to impurities present in the water. Many photographers find it a wise decision to use distilled water for all stock solutions, adding tap water for dilution.

The time required for the preparation of processing solutions can be reduced materially by the use of hot water (about 125° F.) as most chemicals dissolve more rapidly in hot than in cold water. A convenient method of preparing one

quart of developer, for instance, is to start with about 24-28 ounces of hot water (125° F.) and after the addition of all chemicals, to add sufficient cold water to bring the total volume up to 32 ounces.

Another point well worth remembering is that of weighing and measuring all quantities as closely as possible. Particular care should be taken to avoid errors in small quantities, as a ten-grain error is obviously a very serious one on a fifty-grain quantity, while on a half-pound quantity it might not have harmful effects.

Finally and no less important for the order in which it is mentioned, is the matter of temperature. The need for uniform regulation of temperature in all processing solutions, and the maintenance of temperatures as close as possible to 65° Fahrenheit (18° C.) for film development and to 70° Fahrenheit (21° C.) for photographic prints, cannot be over-emphasized.

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# AGFA FORMULAS

## AGFA 12 FINE-GRAIN TANK DEVELOPER

This fine-grain formula keeps well and makes an excellent tank developer.

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	8 grams	$\frac{1}{4}$ oz. 10 gr.	1 oz. 40 gr.
Agfa Sodium Sulphite, anhydrous.....	125 grams	4 oz. 75 gr.	16 $\frac{1}{2}$ oz.
Agfa Sodium Carbonate, monohydrated.....	5.75 grams	85 grains	$\frac{1}{4}$ oz. 10 gr.
Agfa Potassium Bromide.....	2.5 grams	36 grains	$\frac{1}{4}$ oz. 35 gr.
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use.

Develop 8 to 12 minutes at 65° F. (18° C.).

## AGFA 15 FINE-GRAIN TRAY DEVELOPER

This is a vigorous, rapid tray developer, giving brilliant results.

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	8 grams	$\frac{1}{4}$ oz. 10 gr.	1 oz. 40 gr.
Agfa Sodium Sulphite, anhydrous.....	125 grams	4 oz. 75 gr.	16 $\frac{1}{2}$ oz.
Agfa Sodium Carbonate, monohydrated.....	14 grams	$\frac{1}{4}$ oz. 100 gr.	1 $\frac{1}{2}$ oz. 50 gr.
Agfa Potassium Bromide.....	1.5 grams	22 grains	88 grains
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use.

For normal contrast develop 3 to 5 minutes at 65° F. (18° C.).

For greater contrast develop about 6 to 10 minutes.

## AGFA 17

## FINE-GRAIN BORAX TANK DEVELOPER

In addition to its usefulness as a fine-grain developer, this formula is satisfactory for obtaining soft gradation with Agfa Direct Copy Film, Agfa Direct Duplicating Film and portrait and press cut films. It is also recommended for motion picture negative development. This developer may be obtained in packaged form ready-to-use by ordering "Agfa Formula 17 Fine-Grain Developer." Formula 17 is a soft-working fine-grain developer.

	<i>Metric</i>		<i>Avoirdupois</i>
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	1.5 grams	22 grains	88 grains
Agfa Sodium Sulphite, anhydrous.....	80 grams	2½ oz. 80 gr.	10½ oz.
Agfa Hydroquinone.....	3 grams	45 grains	½ oz. 70 gr.
Borax .....	3 grams	45 grains	½ oz. 70 gr.
Agfa Potassium Bromide.....	.5 gram	7.5 grains	30 grains
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use.

Development time at 65° F. (18° C), 10 to 15 minutes for fine-grain films, 12 to 20 minutes for Direct Copy, Direct Duplicating, and portrait cut films.

## AGFA 17A REPLENISHER

Add whenever necessary to keep tank up to full volume.

	<i>Metric</i>		<i>Avoirdupois</i>
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	2.2 grams	32 grains	½ oz. 20 gr.
Agfa Sodium Sulphite, anhydrous.....	80 grams	2½ oz. 80 gr.	10½ ounces
Agfa Hydroquinone.....	4.5 grams	65 grains	½ oz. 50 gr.
Borax .....	18 grams	½ oz. 45 gr.	2½ oz. 75 gr.
Water to make.....	1 liter	32 ounces	1 gallon

## AGFA 20

## M-H POSITIVE DEVELOPER

This clean-working developer is recommended for normal contrast with tray or tank development of positive film.

	<i>Metric</i>		<i>Avoirdupois</i>
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	2 grams	30 grains	½ oz. 10 gr.
Agfa Sodium Sulphite, anhydrous.....	25 grams	½ oz. 40 gr.	3½ oz. 40 gr.
Agfa Hydroquinone.....	4 grams	60 grains	½ oz. 20 gr.
Agfa Sodium Carbonate, monohydrated.....	18.5 grams	½ oz. 50 gr.	2½ ounces
Agfa Potassium Bromide.....	2 grams	30 grains	½ oz. 10 gr.
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use. Normal developing time 3 to 4 minutes at 65° F. (18° C.).

**AGFA 22****M-H TITLE DEVELOPER**

This formula is recommended for tray or tank development of cine title film and positive film to obtain results of high contrast.

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	.8 gram	12 grains	52 grains
Agfa Sodium Sulphite, anhydrous.....	40 grams	1½ ounces	5 ounces
Agfa Hydroquinone.....	8 grams	½ oz. 10 grs.	1 oz. 40 gr.
Agfa Sodium Carbonate, monohydrated.....	50 grams	1½ ounces	7 ounces
Agfa Potassium Bromide.....	5 grams	75 grains	½ oz. 80 grs.
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use. Normal developing time 5 to 8 minutes at 65° F. (18° C.).

**AGFA 30****X-RAY DEVELOPER**

This developer is recommended for use with Agfa X-Ray Film and for use with Agfa Direct Copy Film and Direct Duplicating Film when results of maximum brilliance are desired. Agfa 30 is also suitable for Agfa S. S. Pan-Aero film as it is clean-working, has long life and gives high contrast.

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	3.5 grams	50 grains	½ oz. 95 gr.
Agfa Sodium Sulphite, anhydrous.....	60 grams	2 ounces	8 ounces
Agfa Hydroquinone.....	9 grams	½ oz. 20 gr.	1 oz. 80 gr.
Agfa Sodium Carbonate, monohydrated.....	40 grams	1½ oz 40 gr.	5½ ounces
Agfa Potassium Bromide.....	2 grams	30 grains	½ oz. 10 gr.
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use.

Normal development time at 65° F. (18° C.), for X-Ray Film, 6 minutes, for Non-Screen X-Ray Film 8 minutes, for Direct Copy Film and Direct Duplicating Film, 4 to 5 minutes, for S. S. Pan-Aero film 10-15 minutes depending upon the type of developing machine.

**AGFA 40****M-H TRAY DEVELOPER**

This is a brilliant Metol-Hydroquinone tray developer for roll, pack and cut film.

	<u>Stock Solution</u>		
	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	900 cc.	29 ounces	3½ quarts
Agfa Metol.....	4.5 grams	66 grains	½ oz. 45 grs.
Agfa Sodium Sulphite, anhydrous.....	54 grams	1½ oz. 25 grs.	7½ ounces
Agfa Hydroquinone.....	7.5 grams	½ oz.	1 ounce
Agfa Sodium Carbonate, monohydrated.....	54 grams	1½ oz. 25 grs.	7½ ounces
Agfa Potassium Bromide.....	3 grams	45 grains	½ oz. 80 grs.
Water to make.....	1 liter	32 ounces	1 gallon

For use dilute 1 part stock solution with 2 parts water.  
Development time 4 to 5 minutes at 65° F. (18° C.).

**AGFA 42**  
**M-H TANK DEVELOPER**

This is a soft-working tank formula recommended for pack, roll and portrait films.

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	.8 gram	12 grains	47 grains
Agfa Sodium Sulphite, anhydrous.....	45 grams	1½ ounces	6 ounces
Agfa Hydroquinone.....	1.2 grams	18 grains	70 grains
Agfa Sodium Carbonate, monohydrated.....	8 grams	¼ oz. 10 gr.	1 oz. 40 gr.
Agfa Potassium Metabisulphite.....	4 grams	59 grains	½ oz. 20 gr.
Agfa Potassium Bromide.....	1.5 grams	22 grains	88 grains
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use.

Develop 15 to 20 minutes at 65° F. (18° C.).

**AGFA 45**  
**PYRO DEVELOPER**

This formula is recommended to those who prefer Pyro development. Stock solutions should be kept in stoppered bottles.

*Solution 1*

	<u>Metric</u>	<u>Avoirdupois</u>	
Agfa Sodium Bisulphite.....	9.8 grams	¼ oz. 35 gr.	1½ oz. 25 gr.
Agfa Pyro .....	60 grams	2 ounces	8 ounces
Agfa Potassium Bromide.....	1.1 grams	16 grains	64 grains
Water to make.....	1 liter	32 ounces	1 gallon

*Solution 2*

	<u>Metric</u>	<u>Avoirdupois</u>	
Agfa Sodium Sulphite, anhydrous.....	105 grams	3½ ounces	14 ounces
Water to make.....	1 liter	32 ounces	1 gallon

*Solution 3*

	<u>Metric</u>	<u>Avoirdupois</u>	
Agfa Sodium Carbonate, monohydrated.....	85 grams	2½ ounces	11 ounces
Water to make.....	1 liter	32 ounces	1 gallon

**TANK DEVELOPMENT:** Take one part each Solutions 1, 2, 3 and add 11 parts water. Normal development time, from 9 to 12 minutes at 65° F. (18° C.). **TRAY DEVELOPMENT:** Take 1 part each Solutions 1, 2, 3 and add 7 parts water. Normal development time, from 6 to 8 minutes at 65° F. (18° C.). Solutions will keep well when stored separately but final developer should be used immediately after mixing.

## AGFA 47

## METOL HYDROQUINONE DEVELOPER

(Formerly 47a)

This is a long-life, clean-working formula which will give excellent results for either tray or tank development. It is a standard cut film developer.

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	1.5 grams	22 grains	88 grains
Agfa Sodium Sulphite, anhydrous.....	45 grams	1½ ounces	6 ounces
Agfa Sodium Bisulphite.....	1 gram	15 grains	60 grains
Agfa Hydroquinone.....	3 grams	45 grains	½ oz. 70 gr.
Agfa Sodium Carbonate, monohydrated.....	6 grams	88 grains	½ oz. 20 gr.
Agfa Potassium Bromide.....	.8 gram	12 grains	47 grains
Water to make.....	1 liter	32 ounces	1 gallon

For developing times below, do not dilute for use.

TANK DEVELOPMENT: Normal development time, 6 to 8 minutes at 65° F. (18° C.) with occasional agitation. TRAY DEVELOPMENT: Normal development time 5 to 7 minutes at 65° F. (18° C.).

## AGFA 61

## M-H TRAY DEVELOPER

This developer is recommended for use with commercial film to produce negatives of normal contrast. It may also be used satisfactorily for roll, pack and cut film for negatives of average brilliance.

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	1 gram	15 grains	60 grains
Agfa Sodium Sulphite, anhydrous.....	15 grams	½ ounce	2 ounces
Agfa Hydroquinone.....	2 grams	30 grains	½ oz. 10 gr.
Agfa Sodium Carbonate, monohydrated.....	15 grams	½ ounce	2 ounces
Agfa Potassium Bromide.....	1 gram	15 grains	60 grains
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use. Normal development time, 4 to 6 minutes at 65° F. (18° C.).

## AGFA 64

## RAPID M-H (TROPICAL) DEVELOPER

This is a clean-working developer of particular value for rapid development or development at high temperatures.

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	2.5 grams	36 grains	$\frac{1}{4}$ oz. 35 grs.
Agfa Sodium Sulphite, anhydrous.....	25 grams	$\frac{1}{2}$ oz. 40 grs.	$3\frac{1}{4}$ oz. 40 grs.
Agfa Hydroquinone.....	6.5 grams	95 grains	$\frac{1}{2}$ oz. 55 gr.
Agfa Sodium Carbonate, monohydrated.....	16 grams	$\frac{1}{2}$ oz. 15 grs.	2 oz. 60 gr.
Agfa Potassium Bromide.....	1 gram	15 grains	60 grains
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use.

Normal development time—3 to 4 minutes at 65° F. (18° C.).  
2 to 3 minutes at 85° F. (29° C.).

## AGFA 70

## HYDROQUINONE CAUSTIC DEVELOPER

(Formerly 70a or PR-1)

This developer is recommended for Process film used in reproduction work.

## Solution 1

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Hydroquinone.....	25 grams	$\frac{1}{2}$ oz. 40 gr.	$3\frac{1}{4}$ oz. 40 gr.
Agfa Potassium Metabisulphite.....	25 grams	$\frac{1}{2}$ oz. 40 gr.	$3\frac{1}{4}$ oz. 40 gr.
Agfa Potassium Bromide.....	25 grams	$\frac{1}{2}$ oz. 40 gr.	$3\frac{1}{4}$ oz. 40 gr.
Cold Water.....	1 liter	32 ounces	1 gallon

## Solution 2

Cold Water .....	1 liter	32 ounces	1 gallon
* Agfa Sodium Hydroxide (Caustic Soda Flakes).....	36 grams	1 oz. 90 gr.	$4\frac{1}{2}$ oz. 30 gr.

Mix equal parts of Solutions 1 and 2 immediately before use.

Develop films within 3 minutes at 65° F. (18° C.).

\* May be substituted by  
Potassium Hydroxide ..... 50 grams       $1\frac{1}{2}$  oz. 80 gr.      6 $\frac{1}{2}$  ounces



## AGFA 72

## GLYCIN DEVELOPER

This formula is recommended for use with commercial films in reproduction work and is also suitable for development of roll, pack and cut film.

*Stock Solution*

	<i>Metric</i>	<i>Avoirdupois</i>	
Agfa Sodium Sulphite, anhydrous.....	125 grams	4½ ounces	1 lb. 1 oz.
Agfa Potassium Carbonate.....	250 grams	8½ ounces	2 lb. 2 oz.
Agfa Glycin .....	50 grams	1½ oz. 80 gr.	6½ ounces
Water to make.....	1 liter	32 ounces	1 gallon

**TANK DEVELOPMENT:** Take one part stock solution, fifteen parts water and develop 20 to 25 minutes at 65° F. (18° C.). **TRAY DEVELOPMENT:** Take one part stock solution, four parts water and develop 5 to 10 minutes at 65° F. (18° C.).

## AGFA 77

## M-H TRAY DEVELOPER

This formula is recommended for development of Direct Copy and Direct Duplicating Films to obtain results of normal brilliance.

*Stock Solution*

	<i>Metric</i>	<i>Avoirdupois</i>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	5 grams	75 grains	½ oz. 75 gr.
Agfa Sodium Sulphite, anhydrous.....	35 grams	1 oz. 75 gr.	4½ oz. 80 gr.
Agfa Hydroquinone.....	3 grams	45 grains	½ oz. 70 gr.
Agfa Sodium Carbonate, monohydrated.....	30 grams	1 ounce	4 ounces
Agfa Potassium Bromide.....	1 gram	15 grains	60 grains
Water to make.....	1 liter	32 ounces	1 gallon

For use dilute one part stock solution with one part water.

Normal developing time 5 minutes at 65° F. (18° C.).

**AGFA 79 (TWO SOLUTION)**  
**PARAFORMALDEHYDE DEVELOPER**

This is a standard formula recommended for development of Reprolith and Reprolith Ortho Films. Agfa 79 may be obtained in packaged form ready-to-use by ordering "Paralith Developer." This developer has better keeping quality than when made in one solution.

*Solution 1*

	<u>Metric</u>	<u>Avoirdupois</u>	
Water.....	750 cc.	24 ounces	3 quarts
Agfa Sodium Sulphite, anhydrous.....	1 gram	15 grains	60 grains
Agfa Paraformaldehyde.....	30 grams	1 ounce	4 ounces
Agfa Potassium Metabisulphite.....	10.5 grams	$\frac{1}{2}$ oz. 45 gr.	$1\frac{1}{2}$ oz. 60 gr.
Water to make.....	1 liter	32 ounces	1 gallon

*Solution 2*

Water.....	750 cc.	24 ounces	3 quarts
Agfa Sodium Sulphite, anhydrous.....	120 grams	4 ounces	1 pound
Agfa Boric Acid.....	30 grams	1 ounce	4 ounces
Agfa Hydroquinone.....	90 grams	3 ounces	12 ounces
Agfa Potassium Bromide.....	6 grams	88 grains	$\frac{1}{2}$ oz. 20 gr.
Water to make.....	3 liters	96 ounces	3 gallons

For use mix one part Solution 1 with three parts Solution 2.

Normal development time 2 to 3 minutes at 65° to 70° F. (18 to 21° C.).

**AGFA 79 (ONE SOLUTION)**  
**PARAFORMALDEHYDE DEVELOPER**

This single solution formula is recommended for greater convenience. For better keeping quality the two solution formula is preferred.

	<u>Metric</u>	<u>Avoirdupois</u>
Water.....	2000 cc.	64 ounces
Agfa Sodium Sulphite, anhydrous.....	120 grams	4 ounces
Paraformaldehyde.....	30 grams	1 ounce
Agfa Potassium Metabisulphite.....	10.5 grams	$\frac{1}{2}$ oz. 45 gr.
Agfa Boric Acid Crystals.....	30 grams	1 ounce
Agfa Hydroquinone.....	90 grams	3 ounces
Agfa Potassium Bromide.....	6 grams	88 grains
Water to make.....	4 liters	1 gallon

Dissolve chemicals in the order given and use solution full strength. Normal development time 2 to 3 minutes at 65° to 70° Fahrenheit (18 to 21° C.).

## AGFA 81

## LONG-LIFE REPROLITH DEVELOPER

This formula may be obtained in packaged form by specifying "Reproolith Developer." Formula No. 81 provides a single-solution developer of excellent keeping quality for the development of Reprolith Film.

	<i>Metric</i>	<i>Avoirdupois</i>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Hydroquinone.....	35 grams	1 oz. 70 gr.	4½ ounces
Agfa Sodium Sulphite, anhydrous.....	55 grams	1½ ounces	7½ ounces
Agfa Sodium Carbonate, monohydrated.....	80 grams	2½ ounces	10½ ounces
Agfa Citric Acid.....	5.5 grams	80 grains	½ ounce
Agfa Potassium Bromide.....	10 grams	½ oz. 35 gr.	1½ ounces
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use. Normal development time within 3 minutes at 65° F. (18° C.).

## AGFA 90

## HIGH CONTRAST M-H TRAY DEVELOPER

This developer has been particularly designed for use with Commercial and Process films\* to produce contrasty negatives.

	<i>Metric</i>	<i>Avoirdupois</i>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	5 grams	75 grains	½ oz. 75 gr.
Agfa Sodium Sulphite, anhydrous.....	40 grams	1½ oz. 40 gr.	5½ ounces
Agfa Hydroquinone.....	6 grams	88 grains	½ oz. 20 gr.
Agfa Sodium Carbonate, monohydrated.....	40 grams	1½ oz. 40 gr.	5½ ounces
Agfa Potassium Bromide.....	3 grams	45 grains	½ oz. 70 gr.
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use.

Normal development time, 4 to 6 minutes at 65° F. (18° C.).

\*This developer may be adapted for high-contrast work with Printon Film by the addition of three grams of Potassium Bromide per liter developer (45 grains per 32 oz.) and development of 2 to 3 minutes at 65° F. (18° C.).

## AGFA 96

## AGFACOLOR DEVELOPER

This formula may be obtained in bottled form ready-to-use by ordering "Agfacolor Developer." It is recommended for use with Agfacolor Plates and Agfacolor Ultra Plates in preference to all other formulas.

	<u>Metric</u>	<u>Avoirdupois</u>	
Agfa Metol.....	3.3 grams	48 grains	$\frac{1}{4}$ oz. 80 grs.
Agfa Sodium Sulphite, anhydrous.....	25 grams	$\frac{1}{2}$ oz. 40 grs.	$3\frac{1}{4}$ oz. 40 grs.
Agfa Hydroquinone.....	1 gram	15 grains	60 grains
Agfa Potassium Bromide.....	1.5 grams	22 grains	88 grains
Ammonia, .91 S. G. (25% by weight).....	7.5 ccm.	2 drams	8 drams
Water to make.....	1 liter	32 ounces	1 gallon

If hot water is used for dissolving chemicals solution should be cooled before adding Ammonia. Do not dilute for use. Normal development time with Agfacolor Plates 3 minutes; with Agfacolor Ultra Plates 4 minutes at 65° F. (18° C.).

## REVERSING BATH

This formula is recommended for use with Agfacolor Plates.

## Stock Solution

	<u>Metric</u>	<u>Avoirdupois</u>
Water .....	1 liter	32 ounces
Agfa Potassium Bichromate.....	50 grams	$1\frac{1}{2}$ ounces
Concentrated Sulphuric Acid.....	100 cc.	$3\frac{1}{4}$ ounces

For use take 10 parts water and to this add one part stock solution. Of the dilute solution thus obtained, about 2 oz. will be required for one  $3\frac{1}{4} \times 4\frac{1}{4}$  plate. The temperature should not be allowed to go higher than 65° F. (18° C.), as the emulsion may otherwise leave the plate.

**AGFA 103**  
**UNIVERSAL FILM AND PAPER DEVELOPER**  
 (Formerly N-103)

This formula may be used both as a developer for film and as a developer for Convira and Brovira papers when cold, blue-black tones are desired. It may be had in package form by ordering Agfa 103 Developer.

*Stock Solution*

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	3.5 grams	50 grains	½ oz. 95 gr.
Agfa Sodium Sulphite, anhydrous.....	57 grams	1½ oz. 50 gr.	7½ ounces
Agfa Hydroquinone.....	11.5 grams	½ oz. 55 gr.	1½ ounces
Agfa Sodium Carbonate, monohydrated.....	78 grams	2½ oz. 35 gr.	10½ ounces
Agfa Potassium Bromide.....	1.2 grams	18 grains	72 grains
Water to make.....	1 liter	32 ounces	1 gallon

**FILM:** Dilute one part stock solution with two parts water. Normal development time 5 minutes at 65° F. (18° C.).

For Convira or Brovira, and similar contact and bromide papers dilute 1 part stock solution with 2 parts water. Develop 1 to 1½ minutes at 70° F. (21° C.).

For slower, softer development of Brovira dilute 1 to 4. Develop 1½ to 3 minutes, at 70° F. (21° C.).

**AGFA 106**  
**WARM-TONE DEVELOPER FOR CHLORIDE PAPER**  
 (Formerly N-86)

This developer is recommended for producing pronounced warm, olive-black tones with Convira and other Chloride Papers.

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	.7 gram	10.5 grains	42 grains
Agfa Sodium Sulphite, anhydrous.....	11.5 grams	½ oz. 60 gr.	1½ oz. 20 gr.
Agfa Hydroquinone.....	3.5 grams	50 grains	½ oz. 95 gr.
Agfa Sodium Carbonate, monohydrated.....	10 grams	½ oz. 35 gr.	1½ oz. 30 gr.
Agfa Potassium Bromide.....	2.4 grams	35 grains	½ oz. 30 gr.
Water to make.....	1 liter	32 ounces	1 gallon

Do not dilute for use.

Normal development time, 1 minute at 70° F. (21° C.).

**AGFA 110**  
**DIRECT BROWN-BLACK PAPER DEVELOPER**  
(Formerly B-10)

Beautiful warm tones may be obtained with this developer on both contact and projection papers.

*Stock Solution*

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Hydroquinone.....	22.5 grams	$\frac{3}{4}$ ounce	3 ounces
Agfa Sodium Sulphite, anhydrous.....	57 grams	1 $\frac{3}{4}$ oz. 50 gr.	7 $\frac{1}{2}$ ounces
Agfa Sodium Carbonate, monohydrated.....	75 grams	2 $\frac{1}{2}$ oz.	10 ounces
Agfa Potassium Bromide.....	2.75 grams	40 grains	$\frac{1}{4}$ oz. 50 gr.
Water to make.....	1 liter	32 ounces	1 gallon

For use dilute one part stock solution with 5 parts water.

Give prints 3 to 4 times normal exposure and develop from 5 to 7 minutes at 70° F. (21° C.).

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**AGFA 113**  
**AMIDOL PAPER DEVELOPER**  
(Formerly AM-3)

This formula is intended for tray development only and *must be mixed fresh each time*. It is recommended only for small lots of prints.

	<u>Metric</u>	<u>Avoirdupois</u>
Agfa Amidol.....	6.6 grams	96 grains
Agfa Sodium Sulphite, anhydrous.....	44 grams	1 $\frac{3}{4}$ oz. 90 gr.
Agfa Potassium Bromide.....	.55 gram	8 grains
Water to make.....	1 liter	32 ounces

Do not dilute for use. If hot water is used for dissolving chemicals the sodium sulphite and potassium bromide should be dissolved first and the amidol added only after the solution has cooled.

Develop 1 to 2 minutes at 70° F. (21° C.).

## AGFA 115

## GLYCIN-HYDROQUINONE DEVELOPER

(Formerly B-15)

This is a warm-tone developer suitable for Indiatone, Portrait Enlarging, Brovira and other projection papers.

*Stock Solution*

	<i>Metric</i>	<i>Avoirdupois</i>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Sodium Sulphite, anhydrous.....	90 grams	3 ounces	12 ounces
Agfa Sodium Carbonate, monohydrated.....	150 grams	5 ounces	1 lb. 4 oz.
Agfa Glycin.....	30 grams	1 ounce	4 ounces
Agfa Hydroquinone.....	9.5 grams	$\frac{1}{4}$ oz. 30 gr.	$1\frac{1}{4}$ oz. 10 gr.
Agfa Potassium Bromide.....	4 grams	60 grains	$\frac{1}{2}$ oz. 20 gr.
Water to make.....	1 liter	32 ounces	1 gallon

For use, dilute 1 part stock solution with 3 parts of water.

Normal development time,  $2\frac{1}{2}$  to 3 minutes at 70° F. (21° C.).

## AGFA 120

## SOFT-WORKING PAPER DEVELOPER

(Formerly B-20)

This is a soft-working developer, primarily intended for portrait work where soft gradation is required.

*Stock Solution*

	<i>Metric</i>	<i>Avoirdupois</i>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	12.3 grams	$\frac{1}{4}$ oz. 70 gr.	$1\frac{1}{2}$ oz. 60 gr.
Agfa Sodium Sulphite, anhydrous.....	36 grams	1 oz. 88 gr.	$4\frac{1}{2}$ ounces
Agfa Sodium Carbonate, monohydrated.....	36 grams	1 oz. 88 gr.	$4\frac{1}{2}$ ounces
Agfa Potassium Bromide.....	1.8 grams	27 grains	$\frac{1}{4}$ ounce
Water to make.....	1 liter	32 ounces	1 gallon

For use, dilute 1 part stock solution with 2 parts water.

Normal developing time,  $1\frac{1}{2}$  to 3 minutes at 70° F. (21° C.).

## AGFA 125 DEVELOPER FOR BROMIDE PAPER (Formerly B-5)

This formula is recommended for development of Brovira and other projection papers. It may be obtained in package form by ordering Agfa 125 Developer.

### Stock Solution

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	3 grams	45 grains	$\frac{1}{4}$ oz. 70 grs.
Agfa Sodium Sulphite, anhydrous.....	44 grams	$1\frac{1}{2}$ ounces	6 ounces
Agfa Hydroquinone.....	12 grams	$\frac{1}{4}$ oz. 60 grs.	$1\frac{1}{2}$ oz. 20 grs.
Agfa Sodium Carbonate, monohydrated.....	65 grams	$2\frac{1}{2}$ ounces	9 ounces
Agfa Potassium Bromide.....	2 grams	30 grains	$\frac{1}{4}$ oz. 10 grs.
Water to make.....	1 liter	32 ounces	1 gallon

For use, dilute 1 part stock solution with 2 parts water. Develop 1 to 2 minutes at 70° F. (21° C.).

For softer and slower development dilute 1 to 4, and develop  $1\frac{1}{2}$  to 3 minutes at 70° F. (21° C.).

For greater brilliance, shorten the exposure slightly and lengthen the development time. For greater softness, lengthen the exposure slightly and shorten the development time.

## AGFA 130 UNIVERSAL PAPER DEVELOPER

This formula is a universal developer for all projection and contact papers. It gives rich black tones with excellent brilliance and detail. Agfa 130 provides unusual latitude in development and is clean-working even with long developing times.

### Stock Solution

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot water (125° F. or 52° C.) .....	750 cc.	24 ounces	3 quarts
Agfa Metol .....	2.2 grams	32 grains	$\frac{1}{4}$ oz. 20 grs.
Agfa Sodium Sulphite, anhydrous .....	50 grams	$1\frac{1}{2}$ ounces	$6\frac{1}{2}$ ounces
Agfa Hydroquinone .....	11 grams	$\frac{1}{4}$ oz. 50 grs.	$1\frac{1}{2}$ ounces
Agfa Sodium Carbonate, monohydrated .....	78 grams	$2\frac{1}{2}$ ounces	$10\frac{1}{2}$ ounces
Agfa Potassium Bromide .....	5.5 grams	80 grains	$\frac{1}{4}$ ounce
Agfa Glycin .....	11 grams	$\frac{1}{4}$ oz. 50 grs.	$1\frac{1}{2}$ ounces
Water to make.....	1 liter	32 ounces	1 gallon

The prepared stock solution is clear but slightly colored. The coloration in this case does not indicate the developer has deteriorated or is unfit for use.

For use dilute 1 part stock solution with 1 part water.

Normal developing time at 70° F. (21° C.) for Brovira and Portrait Enlarging 2 to 6 minutes, for Indiatone, Convira and Professional Cyko  $1\frac{1}{2}$  to 3 minutes.

Greater contrast can be obtained by using the developer stock solution full strength. Softer results can be obtained by diluting 1 part stock solution with 2 parts water.



**AGFA 135**  
**WARM-TONED PAPER DEVELOPER**  
 (Formerly W-5)

This formula may be obtained in packaged form ready-to-use by ordering W-5 Developer. This developer is recommended for rich, warm-black tones with chloride and bromide papers.

*Stock Solution*

	<i>Metric</i>	<i>Avoirdupois</i>	
Hot Water (125° F. or 52° C.).....	750 cc.	24 ounces	3 quarts
Agfa Metol.....	1.6 grams	24 grains	96 grains
Agfa Sodium Sulphite, anhydrous.....	24 grams	$\frac{3}{4}$ oz. 20 grs.	$3\frac{1}{4}$ oz.
Agfa Hydroquinone.....	6.6 grams	96 grains	$\frac{3}{4}$ oz. 60 grs.
Agfa Sodium Carbonate, monohydrated.....	24 grams	$\frac{3}{4}$ oz. 20 grs.	$3\frac{1}{4}$ oz.
Agfa Potassium Bromide.....	2.8 grams	40 grains	$\frac{1}{4}$ oz. 50 grs.
Water to make.....	1 liter	32 ounces	1 gallon

For use, dilute 1 part stock solution with 1 part water. A properly exposed print will be fully developed at 70° F. (21° C.) in about 1½ to 2 minutes. Complete development may be expected to take slightly longer with rough-surfaced papers than with semi-glossy or luster-surfaced papers. For greater softness, dilute the bath with water up to equal quantities of developer and water. To increase the warmth, add bromide up to double the amount in the formula. The quantity of bromide specified in the formula, however, assures rich, warm, well-balanced tones.

**ACID SHORT-STOP BATH**

This solution is recommended for use between developer and fixer, to prevent staining of film negatives and prints.

	<i>Metric</i>	<i>Avoirdupois</i>
Acetic Acid 28%.....	45 cc.	1½ ounces
Water to make.....	1 liter	32 ounces

Glacial Acetic Acid (99.5%) may be diluted to the 28% concentration by mixing three parts of Glacial Acetic Acid with eight parts of water.

**CHROME ALUM HARDENING BATH**

This bath may be used in place of the regular acetic acid short-stop to give additional hardening to film. It is particularly desirable in hot weather, for tropical development, and for negatives which have to be enlarged wet.

	<i>Metric</i>	<i>Avoirdupois</i>
Agfa Potassium Chrome Alum .....	30 grams	1 ounce
Water .....	1 liter	32 ounces

Films should be agitated thoroughly when immersed in the solution. Maximum hardening will be obtained with about three minutes treatment.

The solution should be used fresh as it does not keep well. Formation of a greenish sludge is an indication that the solution should be replaced by a fresh bath.

If the Chrome Alum used is such that a sludge is formed when the bath is first used an addition of concentrated Sulphuric Acid (2 cc. per liter or ½ dram per 32 ounces) can be made to the solution to overcome this condition.

## AGFA 201 ACID HARDENING FIXER

This hardening fixing bath for use with either film or paper may be stored indefinitely and used repeatedly until exhausted. If the fixing bath froths, turns cloudy, or takes longer than 10 minutes to fix out completely, it must be replaced by a fresh solution.

### Solution 1

	<u>Metric</u>	<u>Avoirdupois</u>	
Hot Water (125° F. or 52° C.).....	500 cc.	16 ounces	$\frac{1}{2}$ gallon
Hypo .....	240 grams	8 ounces	2 pounds

### Solution 2

Hot Water (125° F. or 52° C.).....	150 cc.	5 ounces	20 ounces
Agfa Sodium Sulphite, anhydrous.....	15 grams	$\frac{1}{2}$ ounce	2 ounces
Acetic Acid (28%).....	45 cc.	1 $\frac{1}{2}$ ounces	6 ounces
Agfa Potassium Alum.....	15 grams	$\frac{1}{2}$ ounce	2 ounces
Add Solution 2 to 1 and add water to make.....	1 liter	32 ounces	1 gallon

Dissolve chemicals thoroughly in order given and stir rapidly while adding solution 2 to solution 1. Glacial Acetic Acid may be diluted to 28% concentration by adding 3 parts of acid to 8 parts of water. Do not dilute for use. Normal fixing time 5 to 10 minutes at 65 to 70° F. (18 to 21° C.).

## AGFA 202 CHROME ALUM FIXER

This hardening fixing bath for use with films in hot weather should be used fresh, as it does not retain its hardening action.

### Solution 1

	<u>Metric</u>	<u>Avoirdupois</u>
Hot Water (125° F. or 52° C.).....	2.5 liters	80 ounces
Hypo.....	960 grams	2 pounds
Agfa Sodium Sulphite.....	60 grams	2 ounces
Water to make.....	3 liters	96 ounces

### Solution 2

Water .....	1 liter	32 ounces
Agfa Potassium Chrome Alum.....	60 grams	2 ounces
Sulphuric Acid C.P.....	8 cc.	$\frac{1}{2}$ ounce

Slowly pour Solution 2 into Solution 1 while rapidly stirring the latter. Do not dilute for use. Do not dissolve the Chrome Alum at a temperature higher than 150° F. (66° C.). Always rinse films thoroughly before fixing. Normal fixing time 5 to 10 minutes at 65° F. (18° C.).

AGFA 203

NON-HARDENING METABISULPHITE FIXER

This fixing bath is recommended for use when hardening is not desired. It is highly desirable for accuracy of registration in color work with Printon Film.

	<u>Metric</u>	<u>Avoirdupois</u>
Hypo .....	1900 grams	4 pounds
Agfa Potassium Metabisulphite.....	270 grams	9 ounces
Water to make.....	4 liters	1 gallon

The Metabisulphite should be added only when the Hypo solution is cool. Do not dilute for use. Normal fixing time 5 to 10 minutes at 65° F. (18° C.).

FARMER'S REDUCER

This is a cutting reducer for lessening the density of heavy negatives and at the same time increasing their contrast. It is especially valuable for reproduction films to clear the whites.

Solution 1

	<u>Metric</u>	<u>Avoirdupois</u>
Hypo.....	240 grams	8 ounces
Water to make.....	1 liter	32 ounces

Solution 2

Agfa Potassium Ferricyanide.....	19 grams	1/2 oz. 55 gr.
Water to make.....	250 cc.	8 ounces

For use mix one part Solution 2 and four parts Solution 1 in 32 parts water. Solutions 1 and 2 should be stored separately and mixed immediately before use.

FLATTENING REDUCER

This reducer is useful for lessening the density and contrast of heavy negatives.

Solution 1

	<u>Metric</u>	<u>Avoirdupois</u>
Agfa Potassium Ferricyanide.....	35 grams	1 oz. 75 grs.
Agfa Potassium Bromide.....	10 grams	1/2 oz. 40 grs.
Water to make.....	1 liter	32 ounces

Bleach in Solution 1 and after thorough washing, redevelop to desired density and contrast in Agfa 47 or other negative developer except fine-grain developers. Then fix and wash in usual manner. Conduct operation in subdued light.

MERCURY INTENSIFIER

This intensifier is recommended for increasing the printing density of thin, flat negatives.

	<u>Metric</u>	<u>Avoirdupois</u>
Agfa Potassium Bromide.....	10 grams	$\frac{1}{4}$ oz. 35 gr.
* Mercuric Chloride.....	10 grams	$\frac{1}{4}$ oz. 35 gr.
Water to make.....	1 liter	32 ounces

Do not dilute for use. Negatives to be intensified must be very thoroughly washed first or yellow stains may result on the intensified negative. Immerse negatives in above solution until thoroughly bleached to the base of the film and then wash in water containing a few drops of hydrochloric acid. Redevelop bleached negatives in 5% Sodium Sulphite or any standard developer. Surface scum which forms during storage of the bleaching solution does not affect the bleacher but should be removed before using the solution.

\* Poison—Danger.

MONCKHOVEN'S INTENSIFIER

(For Reproduction Films)

This formula gives very great intensification and contrast for line drawing and halftone reproduction work.

*Solution 1*

	<u>Metric</u>	<u>Avoirdupois</u>
Agfa Potassium Bromide.....	23 grams	$\frac{1}{4}$ ounce
* Mercuric Chloride.....	23 grams	$\frac{1}{4}$ ounce
Water to make.....	1 liter	32 ounces

*Solution 2*

Cold Water.....	1 liter	32 ounces
* Potassium Cyanide.....	23 grams	$\frac{1}{4}$ ounce
Agfa Silver Nitrate.....	23 grams	$\frac{1}{4}$ ounce

The silver nitrate and the potassium cyanide should be dissolved in separate lots of water, and the former added to the latter until a permanent precipitate is produced. The mixture is allowed to stand 15 minutes, and after filtering, forms Solution 2.

Place negatives in Solution 1 until bleached through, then rinse and place in Solution 2. If intensification is carried too far, the negative may be reduced with a weak solution of hypo.

\* WARNING—Because of the deadly poisonous nature of this intensifier, it should be used with care and bottles containing it should be suitably marked. Never mix cyanide solutions with acids or use them in poorly ventilated rooms. Discard waste solutions into running water.

### CHROMIUM INTENSIFIER

This formula is recommended because it is convenient in use and gives permanent results.

	<u>Metric</u>	<u>Avoirdupois</u>
Agfa Potassium Bichromate.....	9 grams	135 grains
Hydrochloric Acid.....	6 cc.	1.6 drams
Water to make.....	1 liter	32 ounces

Immerse negatives in this solution until bleached, wash for 5 minutes in running water, and redevelop in bright but diffused light in a Metol Hydroquinone developer such as Agfa No. 47. Negatives should then be given a 15-minute wash before drying. Intensification may be repeated for increased effect.

If any blue coloration of the film base is noticeable after intensification, it may be easily removed by washing the film for two or three seconds in water containing a few drops of ammonia, in a 5% solution of potassium metabisulphite, or in a 5% solution of sodium sulphite. This treatment should be followed by a thorough washing in water.

### AGFA 221 SEPIA TONER

This toner is recommended for warm-brown sepia tones.

#### *Solution 1*

	<u>Metric</u>	<u>Avoirdupois</u>
10% Potassium Ferricyanide Solution .....	500 cc.	17½ fluid oz.
10% Potassium Bromide Solution.....	100 cc.	3½ fluid oz.
10% Sodium Carbonate Solution.....	200 cc.	7 fluid oz.
Water .....	200 cc.	7 fluid oz.

Do not dilute for use.

#### *Solution 2*

Agfa Sodium Sulphide.....	45 grams	1½ ounces
Water to make.....	500 cc.	16 ounces

For use as described below, dilute one part solution 2 with eight parts water.

**IMPORTANT**—Be sure to use Sodium Sulphide, not Sodium Sulphite, in compounding the Re-Developer. Also, use clean trays, free from exposed iron spots, especially with Bleaching Bath. Otherwise blue spots may form on prints.

Prints should be washed thoroughly and then bleached in Solution 1 until the black image is converted to a very light brown color (about 1 minute). Prints should then be washed for 10 to 15 minutes and redeveloped in diluted Solution 2.

Redevelopment should be complete in about 1 minute. After redevelopment the prints should be washed for about 30 minutes and then dried. If the toner should leave sediment which results in streaks or finger marks on the surface of the paper the print should be immersed for a few seconds in a 3% solution of acetic acid. A washing of about 10 minutes after this procedure is necessary.

AGFA 222

HYPO ALUM TONER

This toner is recommended for beautiful reddish-brown tones.

Solution 1		
	<u>Metric</u>	<u>Avoirdupois</u>
Water .....	2350 cc.	80 ounces
Hypo.....	450 grams	15 ounces
Solution 2		
Water .....	30 cc.	1 ounce
Agfa Silver Nitrate.....	1½ grams	20 grains
Solution 3		
Water .....	30 cc.	1 ounce
Agfa Potassium Iodide.....	2½ grams	40 grains

Add Solution 2 to Solution 1. Then add Solution 3 to the mixture. Finally add 105 grams (3½ ounces) of Agfa Potassium Alum to this solution, and heat the entire bath to the boiling point, or until sulphurization takes place (indicated by a milky appearance of the solution). Tone prints 20 to 60 minutes in this bath at 110-125° F. (43-52° C.). Agitate prints occasionally until toning is complete.

Care should be taken to see that the blacks are fully converted before removing the prints from the toning bath, otherwise double tones may result.

PINAKRYPTOL GREEN DESENSITIZER

This solution is not recommended for high speed panchromatic films.

Stock Solution		
	<u>Metric</u>	<u>Avoirdupois</u>
Pinakryptol Green.....	1 gram	15 grains
* Water to make.....	500 cc.	16 ounces

For use dilute one part stock desensitizing solution with ten parts water. Immerse films in total darkness for two minutes at 65° F. (18° C.). Development may then be carried out in bright red light. (Agfa Safelight Filter No. 107 with a 25-watt lamp).

The same stock solution may be used, if preferred, directly in the developer in the proportion: desensitizer: one part, developer: thirty parts. After two minutes' development in total darkness, bright red light may be used as above.

\* Use of a 50-50 water-alcohol mixture for solution will improve the keeping qualities of the desensitizer.

PINAKRYPTOL YELLOW DESENSITIZER

	<i>Metric</i>	<i>Avoirdupois</i>
Pinakryptol Yellow.....	1 gram	15 grains
* Water to make.....	1 liter	32 ounces

Use without dilution at a temperature of 65° F. (18° C.). Immerse films in total darkness for two minutes. Orthochromatic film and Agfacolor Plates may then be handled in bright red light (Agfa Safelight Filter No. 107 with 25-watt lamp), panchromatic film and Agfa Ultra Color Plates in bright green light (Agfa Safelight Filter No. 103 with 25-watt lamp). Pinakryptol Yellow desensitizer should be used as a separate bath and not mixed with the developer.

\* Use of a 50-50 water-alcohol mixture for solution will improve the keeping qualities of the desensitizer.

	SOFT For Contrasty Negatives	MEDIUM For Normal Negatives	HARD For Soft Negatives	EXTRA HARD For Extra Soft Negatives
<b>SINGLE WEIGHT</b>				
Glossy	7431	7432	7433	7434
Velvet	7511	7512	7513	7514
<b>DOUBLE WEIGHT</b>				
Glossy	7031	7032	7033	—
Velvet	7211	7212	7213	7214
Matte White	7051	7052	7053	7054
Silk White	7111	7112	—	—
Royal White	7251	7252	7253	7254
Crystal White	7171	7172	7173	—
Porcelain White	7191	7192	—	—
Kashmir White	7261	7262	7263	—
Kashmir Ivory	7271	7272	7273	—

In ordering chemicals be sure to specify AGFA "Laboratory-Tested" Chemicals. Prepared especially for photographic use, Agfa Chemicals are clean, free running, easily soluble and of highest purity. Consult catalog P-56 or price list P-12 for complete listing of Agfa Photographic Chemicals.

If you prefer the convenience and time-saving advantages of prepared developers, ask your dealer for AGFA prepared developers and fixers. Supplied in several sizes, these prepared chemicals are ready-mixed and need only to be dissolved in water to make them ready for use. The following are a few of the preparations available:

AGFA 17 (Fine-Grain) Developer  
AGFA 17A Replenisher  
AGFA 47 Developer  
AGFA 47A Replenisher  
AGFA 103 (N-103) Developer for Film and Paper  
AGFA 125 (B-5) Paper Developer  
AGFA 135 (W-5) Paper Developer  
AGFA 320 Deep-Tank Developer  
AGFA 320A Deep-Tank Replenisher  
AGFA Acid Hypo  
AGFA Rapid Fixer  
AGFA Rodinal  
AGFA Direct Sepia Toner  
AGFA Brovira Toner  
AGFA Mercury Intensifier

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